

NON-PUBLIC?: N
ACCESSION #: 9011260132
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Cooper Nuclear Station PAGE: 1 OF 4

DOCKET NUMBER: 05000298

TITLE: Unplanned Automatic Reactor Scram and ESF Actuations Due to a 345
kV Ground Fault Caused by an Unrestrained Temporary Power Cable
EVENT DATE: 10/17/90 LER #: 90-011-00 REPORT DATE: 11/16/90

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: N POWER LEVEL: 100

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR
SECTION:

50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:

NAME: Donald L. Reeves, Jr. TELEPHONE: (402) 825-3811

COMPONENT FAILURE DESCRIPTION:

CAUSE: SYSTEM: COMPONENT: MANUFACTURER:

REPORTABLE NPRDS:

SUPPLEMENTAL REPORT EXPECTED: NO

ABSTRACT:

On October 17, 1990, at 1:49 PM, with the plant in operation at full power, a reactor scram and several ESF actuations, including Group Isolations and Emergency Core Cooling System actuations, occurred due to a ground fault on the 345 kV Phase A transmission line, causing the 345 kV output breakers to open. The ground fault occurred when gusting wind conditions caused a power cable (5/C-#10) to a temporary construction elevator which was installed to facilitate refurbishment of the Reactor Building roof, to come into contact with the 345 kV A Phase transmission line and the transmission tower shield line. Power to the station was immediately restored through the Startup Transformer. This power source, however, was interrupted within three seconds of the initial ground fault when a piece of the power cable made contact between the 345 kV Phase C transmission line and the 161 kV Phase A transmission line. Upon sensing loss of voltage on the 4160 VAC Critical buses, supply breakers from the Emergency Transformer closed, repowering the 4160 VAC Critical

Switchgear.

The root cause of this event is failure to establish and implement sufficient work control measures for the Reactor Building roof refurbishment activity, considering the location selected for staging of the work.

Corrective actions taken included verification of proper transmission system protective relay operations; transmission line inspections; and inspections and testing of the Normal, Startup and Main power transformers. The temporary construction elevator was relocated, and the materials on the roof that could be dislodged by high winds were removed. Extensive work control measures were established in preparation for completion of the refurbishment effort. This event and the corrective measures taken will be disseminated to appropriate NPG personnel.

END OF ABSTRACT

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A. Event Description

On October 17, 1990, at 1:49 PM, a reactor scram occurred due to a ground fault on the 345 kV Phase A transmission line. The ground fault occurred when gusting wind conditions caused a power cable (5/C-#10) to a temporary construction elevator to come into contact with the 345 kV A Phase transmission line and the transmission tower shield line. At the time of the event, wind gusts as high as 40.5 mph were recorded at the 10 meter level at the Meteorological Tower, located to the North of the plant. The temporary construction elevator, installed as a means to transfer personnel and materials to the top of the Reactor Building for a roof refurbishment project, was located at the southwest corner of the Reactor Building, approximately 34 feet from the 345 kV transmission lines. That elevator location had been selected since it was the only site affording direct access to the Reactor Building roof from the ground level.

Relay actuation, as a result of the ground fault, caused the two 345 kV generator output breakers in the 345 kV Switchyard to open resulting in a Generator Load Reject. Power to the station was immediately restored through the Startup Transformer. This power source, however, was interrupted within three seconds of the initial ground fault when a piece of the cable, partially disintegrated by the high voltage discharge, was blown by the wind and the force of

the initial contact across the 345 kV C Phase and the 161 kV A Phase transmission line. As a result; the 161 kV transmission line experienced a Phase A fault, causing the Startup Transformer breakers in the 161 kV Switchyard to trip. upon sensing loss of voltage on the 4160 VAC Critical buses, supply breakers from the Emergency Transformer closed, repowering the 4160 VAC Critical Switchgear.

Subsequent to the reactor scram, ESF actuations included Groups 1, 2, 3, 6 and 7 Isolations, automatic actuation of the High Pressure Coolant Injection System (HPCI), and automatic startup (but not sequential loading) of both Diesel Generators. Additionally, the Reactor Core Isolation Cooling (RCIC) System was automatically actuated, as were five (5) of the eight (8) Safety Relief Valves (S/RVs).

Groups 2, 3 and 6 Isolations (Reactor Coolant System, Reactor Water Clean Up RWCU! System, and Primary and Secondary Containment, including startup of the Standby Gas Treatment SGT! System) were actuated as would be expected due to an immediate shrink in Reactor Vessel water level. Groups 1 and 7 Isolations (Main Steam Isolation Valves MSIVs! and Reactor Water Sample Valves) were actuated as a result of the loss of power to the Reactor Protection System following loss of power from the Startup Transformer. Automatic startup of the Diesel Generators occurred as designed upon loss of the Startup Transformer. Automatic actuation of HPCI and RCIC occurred as a result of the loss of inventory from the reactor vessel. S/RV actuations occurred subsequent to closure of the MSIVs, consistent with the expected pressurization transient that would result from a Generator Load Rejection without Bypass event.

Licensed operators established control of Reactor Vessel water level and pressure, using HPCI to restore and maintain water level (RCIC was manually tripped) and manually actuating S/RVs, along with HPCI, to control pressure. Both Residual Heat Removal (RHR) loops were placed in the Suppression Pool Cooling mode to dissipate the heat added to the Suppression Pool as a result of operation of HPCI and actuation of the S/RVs.

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A. Event Description (Continued)

A visual inspection and assessment of the Startup transformer, the associated relay actuations, and the affected portion of the transmission line was performed, revealing no problems. At 3:20 PM, normal power was restored to the station, reenergizing the

non-critical 4160 VAC buses. Subsequently, equipment restoration activities were initiated and preparations were made to conduct a normal cooldown to cold shutdown conditions.

B. Plant Status

Operating at approximately 100 percent power (2378 MWt; 797MWe).

C. Basis for Report

Unplanned automatic actuation of the RPS and ESF actuations, reportable in accordance with 10CFR50.73 (a)(2)(iv).

D. Cause

While planning and preparing for the Reactor Building roof replacement effort and during review of these plans and preparations by both Corporate Engineering and Station Management, concerns associated with the proximity of the temporary construction equipment and handling of roofing materials adjacent to the Main Power Transformers and transmission lines to the 345 kV Switchyard were discussed. Structural concerns, including wind loadings, and anchorage of the temporary construction elevator to the Reactor Building were thoroughly reviewed; however, details regarding the temporary construction elevator power cable were overlooked.

During the course of supervising this job, the operation of the elevator was observed on a nearly continuous and daily basis by the contractor and the NPPD inspectors, as well as periodically by corporate office Nuclear Engineering Department (NED) personnel and Nuclear Projects and Construction Department (NPCD) personnel. Oversight was provided by the Fire Protection & Industrial Safety Supervisor and CNS Management on a random basis after providing the original release for elevator operation following completion of a punch list of safety concerns. While on occasion, one or more of these individuals observed the power cable moving a distance of four (4) feet or so into the elevator structure under light wind conditions, and several noted the excess cable coiled on the ground, the potential for the cable to come into contact with the transmission line was not foreseen.

The root cause of this event is the failure to establish and implement sufficient work control measures for the Reactor Building roof refurbishment activity, considering that the location selected for staging of the work was approximately 34 feet from the transmission lines. While conscientious and deliberate efforts were

made by a number of NED, NPCD and CNS engineering and management personnel to anticipate potential problems associated with the location, and to assure job and personnel safety under abnormal weather conditions, the elevator cable was not recognized as a threat to make contact with the transmission lines.

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E. Safety Significance

None. While the RPS and a number of ESFs were challenged, the associated systems and components performed as designed. The immediate response by Operations personnel to the transient and to operational concerns that resulted from the loss of all non-critical buses was appropriate, enabling rapid stabilization of critical plant parameters (i.e.; Reactor Vessel water level and pressure) and achievement of overall operational control of the plant under reduced electrical power conditions.

F. Safety Implications

None. The consequences of this event at any other power level or in any other operational condition would not have been more significant than the full power condition under which the plant was operating at the time of this event.

G. Corrective Action

As previously discussed in Section A, Event Description and in Section E, Safety Significance, equipment and system response, and both immediate and followup actions by Operations personnel were correct and responsive to the operational conditions presented and limitations that existed. Upon restoration of off-site power, a plant cooldown to cold shutdown conditions was performed to facilitate previously planned, unscheduled shutdown maintenance tasks.

Corrective action taken with respect to the 345 kV and 161 kV Systems included verification of proper protective relay operations, including both in-plant and switchyard breaker response; performance of an evaluation which confirmed that the 345 kV fault and resulting system instability did not generate the 161, kV line fault; transmission line inspections and performance of a minor repair to the 345 kV Phase A transmission line (smoothing of rough edges at the point of contact with the temporary construction elevator power cable); inspection and testing of the Normal, Startup and Main power

transformers; a visual inspection of the Emergency transformer; and an examination and subsequent repair of a section of 4 inch Nitrogen supply piping (4 very small indications) which resulted from the disintegration of the temporary construction elevator power cable plug connection.

The temporary construction elevator was removed prior to resumption of power operations so as to avoid any further potential for the elevator or work staging activities to affect the 345 kV or 161 kV Transmission Systems. Extensive work control measures have been established, in preparation for completing the roof refurbishment effort. Work is currently in progress to relocate the elevator to the North side of the Reactor Building as a means of avoiding staging of the work in the vicinity of the transmission lines. Additionally, the materials, tools and equipment that had been on the roof were removed, with the exception of several large rolls of rubber that were secure because of their weight and low profile.

This event and the corrective measures taken will be disseminated to appropriate NPG personnel, emphasizing the need to establish and implement proper controls for infrequent/unusual work as a means of achieving safe, reliable plant operation and in assuring personnel safety.

H. Similar Events

None.

ATTACHMENT 1 TO 9011260132 PAGE 1 OF 1

COOPER NUCLEAR STATION
P.O. BOX 98, BROWNVILLE, NEBRASKA 68321
Nebraska Public Power District TELEPHONE (402) 825-3811

CNSS903938

November 16, 1990

U.S. Nuclear Regulatory Commission
Document Control Desk

Washington, D.C. 20555

Dear Sir:

Cooper Nuclear Station Licensee Event Report 90-011, is being forwarded

as an attachment to this letter.

Sincerely,

J. M. Meacham
Division Manager
Nuclear Operations
Cooper Nuclear Station

/bjs

Attachment

cc: R. D. Martin
G. R. Horn
R. E. Wilbur
V. L. Wolstenholm
D. A. Whitman
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